Water Glass as a Medium for Permanently Mounting Dissections of Herbarium Material

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During the past four years I have given some attention to the problem of selecting a simple, permanent, and satisfactory method of preserving dissections of flowers in the herbarium in connection with taxonomic work. The methods generally used are more or less unsatisfactory, partly because of the involved technique in mounting material in the media commonly used, such as Canada balsam, Venetian turpentine, glycerine, glycerine jelly, etc., and partly because of the unsatisfactory nature of the mounting medium, particularly glycerine and glycerine jelly, as to permanency.

The common herbarium practice is to boil the flowers or fruits selected for dissection in water, or in water with a little glycerine added. After dissection and examination the fragments are normally placed in small packets attached to the sheets. This involves considerable breakage, more or less loss of material, and furthermore, if reëxamination of the dissections is necessary, as is frequently the case, the material must be softened again; in the majority of cases the taxonomist will remove and dissect additional flowers or fruits rather than take the trouble to soften the original dissections. Frequently, where scanty material is available, this results in the ultimate destruction of essential parts, and one will find important historical specimens from which all or most of the flowers have thus been detached, leaving little or nothing for reëxamination. In those cases where but scanty material is available it is essential that every effort be made to preserve the parts used for dissection.

In some herbaria the dissections are attached in a smear of gum arabic, or some other adhesive, either to the herbarium sheet itself, or to small pieces of stiff paper or cardboard, which in turn are attached to the sheet or placed in a packet. This method is distinctly unsatisfactory for several reasons. In many cases the adhesive cracks; in humid climates it is apt to mold; sometimes insects are attracted by the paste and occasionally destroy both the paste and dissections; and there is frequently breakage or loss of dissections. Material so mounted is distinctly unsatisfactory for reëxamination unless again moistened, and moistening is often difficult. The greatest objection is that the opaque-

ness of the mounts renders reëxamination under the microscope distinctly unsatisfactory and in some cases impossible.

The technique of the Canada balsam, Venetian turpentine, glycerine and glycerine jelly methods of mounting is so well known that discussion is hardly necessary. With Canada balsam the material must be dehydrated and then passed through different grades of xylol before mounting, involving a distinct time element. Another objection, other than the time involved, is that very delicate thin structures frequently contract and curl. With Venetian turpentine there is less curling and little shrinkage, the chief objection here being the tedious technique. Glycerine and glycerine jelly preparations are particularly unsatisfactory, as they cannot be filed with the herbarium specimens, and moreover they cannot be considered as permanent mounts.

For all ordinary purposes in connection with herbarium practice the best medium so far tested is ordinary water glass (sodium silicate). The manipulation of this medium is simple in the extreme. Sodium silicate can be used direct with either boiled or fresh material and either in the field or in the laboratory. The parts of dried specimens selected for examination are boiled in water until they are soft and can be readily dissected without breaking. After dissection and study the extra water on the slide is removed by applying the edge of a piece of blotting paper. The dissections are then properly arranged and allowed to dry slightly in the air, after which a little sodium silicate is dropped on the slide, the amount being in proportion to the dissected material to be preserved. Sodium silicate solidifies quickly, hence it is essential that the cover glass be added with little delay. In practice, ordinary glass slides have been found to be most satisfactory, but mica, isinglass, or thin celluloid may also be used. The great advantage of this method is that the finished slide may be placed almost at once in a packet attached to the sheet, which is distinctly advantageous as compared with the more common method of preserving them in cabinets, remote from the herbarium specimens with which they logically belong. The prepared slides are permanent, dry, easy to use, and there is comparatively little shrinkage or distortion of the dissectons. While the method is not adapted to finer phases of microscopic technique, it is admirably adapted to ordinary herbarium purposes.

With fresh material the technique is much the same as with

softened parts taken from the herbarium sheets. It is only necessary to remove the excess moisture before adding the sodium silicate.

In rare cases where it is desirable to reëxamine the mounted dissections in a soft state, the entire mount, if glass or mica slides be used, may be boiled in water for an hour or so and then left in an evaporating dish in water for a longer period. In due time the cover glass can be easily raised, leaving the mounted material in a soft state and ready for further dissection and manipulation. However, it is seldom necessary to remove the cover glass as the slide is always in condition for immediate examination.

This simple method has been found in practice to be eminently satisfactory and is recommended to herbarium workers generally. This medium was suggested to me by Director Merrill of the New York Botanical Garden when I was associated with him at the University of California. He informs me that it has been used during the past year in the herbarium of The New York Botanical Garden with eminently satisfactory results.

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